CLAIMS

What is claimed is:

1.      A method of using a degradation level of a process entity within a process plant, comprising:

5          estimating a level of degradation of the process entity at a first time based on one or more process parameters associated with the process entity;

comparing the estimated level of the degradation of the process entity at the first time to a predetermined desired level of degradation of the process entity at the first time; and

10          altering the operation of the process entity based on the comparison step to drive an estimated level of degradation of the process entity at a second time after the first time to be approximately equal to a predetermined desired level of degradation at the second time, wherein the predetermined desired level of degradation at the second time is greater than the predetermined desired level of degradation at the first time.

15          2.      The method of claim 1, wherein the step of estimating the level of degradation includes using a model of the process entity to estimate the level of degradation of the process entity.

3.      The method of claim 1, wherein the steps of estimating, comparing and altering are repeated at various times during the operation of the process entity for
20      different times.

4.      The method of claim 1, further including the step of designating a fiducial line including a plurality of points, each point defining a predetermined level of degradation of the process entity at a different time and wherein the step of comparing includes the step of using the fiducial line to determine the predetermined

5      desired level of degradation of the process entity at the first time and the step of altering the operation of the process entity includes using the fiducial line to determine the predetermined desired level of degradation at the second time.

5.      The method of claim 4, further including the step of altering the fiducial line during operation of the process entity to thereby change the desired level

10      of degradation at one of the first or second times.

6.      The method of claim 4, wherein the fiducial line defines a plurality of points between a clean and a fouled condition of the process entity.

7.      The method of claim 1, wherein the step of altering includes using an optimization procedure to alter the operation of the process entity.

15      8.      The method of claim 1, wherein the step of estimating includes estimating a coking level of a furnace within the process plant.

9.      The method of claim 8, wherein the step of altering includes the step of changing a flow rate through the furnace.

10.      The method of claim 8, wherein the step of altering includes the step of

20      changing a temperature associated with the furnace.

11.      The method of claim 8, wherein the step of altering includes the step of changing an amount of steam injected into the furnace.

12.     The method of claim 1, further including using a result of a comparison determined by the step of comparing to produce an index defining a utilization of the process entity.

13.     The method of claim 1, wherein the step of altering includes the step of

5     defining a line between the estimated level of degradation of the process entity at the first time and the predetermined desired level of degradation at the second time and using the defined line to alter the operation of the process entity.

14.     The method of claim 13, wherein the step of using the defined line includes using the slope of the defined line.

10     15.     The method of claim 1, wherein the step of estimating includes the step of collecting data indicative of the process parameters from multiple data sources.

16.     The method of claim 15, wherein the step of collecting data includes collecting process control data and collecting process maintenance data.

17.    A process control system adapted to use a degradation level of a process entity within a process plant that has a processor communicatively connected to multiple process devices, comprising:

a memory;

5    a first routine stored on the memory and adapted to be executed on the processor to estimate a level of degradation of the process entity at a first time based on one or more process parameters associated with the process entity;

a second routine stored on the memory and adapted to be executed on the processor to compare the estimated level of the degradation of the process entity at the

10    first time to a predetermined desired level of degradation of the process entity at the first time; and

a third routine stored on the memory and adapted to be executed on the processor to determine an alteration for the operation of the process entity based on the comparison of the second routine to drive the estimated level of degradation of the

15    process entity at a second time after the first time to be approximately equal to a predetermined desired level of degradation at the second time, wherein the predetermined desired level of degradation at the second time is greater than the predetermined desired level of degradation at the first time.


18.    The process control system of claim 17, wherein the first routine

20    includes a model of the process entity and uses the model of the process entity to estimate the level of degradation of the process entity.


19.    The process control system of claim 17, wherein the first, second and third routines are adapted to operate at various different times during the operation of the process entity.

20.     The process control system of claim 17, further including a fiducial line stored in the memory, the fiducial line including a plurality of points, each point defining a predetermined level of degradation of the process entity at a different time and wherein the second routine is adapted to use the fiducial line to determine the

5   predetermined desired level of degradation of the process entity at the first time and the third routine is adapted to use the fiducial line to determine the predetermined desired level of degradation at the second time.

21.     The process control system of claim 20, further including a fourth routine stored in the memory and adapted to be executed on the processor to enable a

10   user to alter the fiducial line during operation of the process entity to thereby change the desired level of degradation at one of the first or second times.

22. .     The process control system of claim 20, wherein the fiducial line defines a plurality of points between a clean and a fouled condition of the process entity.

15   23.     The process control system of claim 17, wherein the third routine includes an optimization routine adapted to produce an indication of the manner of altering the operation of the process entity to drive the estimated level of degradation of the process entity at the second time to be approximately equal to the predetermined desired level of degradation of the process entity at the second time.

20   24.     The process control system of claim 17, further including a fourth routine stored on the memory and adapted to be executed on the processor to use a result of a comparison determined by the second routine to produce an index defining a utilization of the process entity.

25.     The process control system of claim 17, wherein the third routine is adapted to define a line between the estimated level of degradation of the process entity at the first time and the predetermined desired level of degradation at the second time and to use the defined line to alter the operation of the process entity.

5       26.     A method of using a degradation level of a process entity within a process plant, comprising:

estimating a level of degradation of the process entity at a first time based on one or more process parameters associated with the process entity;

comparing the estimated level of the degradation of the process entity at the

10      first time to a predetermined desired level of degradation of the process entity at the first time;

using a result of the comparison determined by the step of comparing to produce an index defining a utilization amount of the process entity.

27.     The method of claim 26, further including the step of altering the

15      operation of the process entity based on the utilization index.

28.     The method of claim 27, wherein the step of altering includes the step of changing the operation of the process entity to drive the utilization index to be a predetermined amount at a second time after the first time.

29.     The method of claim 26, wherein the step of estimating the level of

20      degradation includes using a model of the process entity to estimate the level of degradation of the process entity.

30.     The method of claim 26, wherein the steps of estimating, comparing and using are repeated at various times during the operation of the process entity for different times.

31.    The method of claim 26, further including the step of designating a fiducial line including a plurality of points, each point defining a predetermined level of degradation of the process entity at a different time and wherein the step of comparing includes the step of using the fiducial line to determine the predetermined

5    desired level of degradation of the process entity at the first time.

32.    The method of claim 31, wherein the fiducial line defines a plurality of points between a clean and a fouled condition of the process entity.

33.    The method of claim 26, wherein the step of estimating includes estimating a coking level of a furnace within a process.

10    34.    The method of claim 26, wherein the step of estimating includes the step of collecting data indicative of the process parameters from multiple data sources.

35.    The method of claim 34, wherein the step of collecting data includes collecting process control data and collecting process maintenance data.